



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,596	04/21/2004	Ki-yeon Park	5649-1286	5520
20792	7590	07/14/2009		EXAMINER
MYERS BIGEL SIBLEY & SAJOVEC				NADAV, ORI
PO BOX 37428			ART UNIT	PAPER NUMBER
RALEIGH, NC 27627			2811	
				MAIL DATE
				DELIVERY MODE
			07/14/2009	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/828,596	PARK ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ori Nadav	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 20 March 2009.

2a) This action is **FINAL**.                            2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1 and 4-69 is/are pending in the application.

4a) Of the above claim(s) 7-10 and 16-69 is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1,4-6 and 11-15 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)	5) <input type="checkbox"/> Notice of Informal Patent Application
Paper No(s)/Mail Date _____ .	6) <input type="checkbox"/> Other: _____ .

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4-6 and 11-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claimed limitations of “forming a metal oxide dielectric film on the oxygen-deficient metal oxide film by ALD using a lanthanum containing compound and an oxidizing agent to form the thin dielectric film comprising the oxygen-deficient metal oxide dielectric film and the metal oxide dielectric film”, as recited in amended claim 1, are unclear as to which element comprises the oxygen-deficient metal oxide dielectric film and the metal oxide dielectric film, since the thin dielectric film belongs to the passage “forming a metal oxide dielectric film on the oxygen-deficient metal oxide film by ALD using a lanthanum containing compound and an oxidizing agent to form the thin dielectric film”.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-6 and 11-15, as best understood, are rejected under 35 U.S.C.

103(a) as being unpatentable over Lim et al. (2003/0040196) in view of Stamm et al. (2001/0040905).

Lim et al. teach in figure 5C and related text a method of forming a thin dielectric film, comprising:

forming an oxygen-deficient metal oxide dielectric film 33 comprising  $\text{La}_2\text{O}_3$ , on a semiconductor substrate by atomic layer deposition (ALD, paragraph [0020]) using a lanthanum containing compound (paragraph [0067]); and

forming a metal oxide dielectric film 34 on the oxygen-deficient metal oxide film by ALD using a lanthanum containing compound and an oxidizing agent to form the thin dielectric film comprising the oxygen-deficient metal oxide dielectric film and the metal oxide dielectric film.

Lim et al. do not teach forming an oxygen-deficient metal oxide film comprising  $\text{La}_2\text{O}_x$  wherein  $0 < x < 3$ .

Stamm et al. teach that layer 104 comprises an oxygen-deficient metal oxide film comprising  $\text{La}_2\text{O}_x$  wherein  $0 < x < 3$ .

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form an oxygen-deficient metal oxide film comprising  $\text{La}_2\text{O}_x$  wherein  $0 < x < 3$  in Lim et al.'s device in order to use the device in a light detection application such as CCD camera and PSD.

Regarding claims 5, 12-13 and 15, Lim et al. teach:

(a) feeding the lanthanum containing compound onto the semiconductor substrate to form an adsorbed layer of the lanthanum containing compound;

(b) removing a byproduct of (a) by means of purge; and

(c) optionally repeating (a) and (b) until the oxygen-deficient metal oxide film with a predetermined thickness is formed, and

annealing the oxygen-deficient metal oxide film, wherein the annealing is carried out after forming the oxygen-deficient metal oxide film or after forming the metal oxide film,

wherein the annealing is carried out under an atmosphere of a gas selected from the group consisting of O<sub>2</sub>, N<sub>2</sub>, and O<sub>3</sub>, or combinations thereof, or under a vacuum atmosphere.

Regarding claims 4, 6, 11 and 14, Lim et al., do not explicitly state that the first reactant is selected from the group consisting of various tris or combinations thereof, the oxygen-deficient metal oxide film has a thickness in a range of about 5A to about 30A, wherein the method is carried out at a temperature in a range of about 200°C to about 350°C, and wherein the annealing is carried out at a temperature in a range of about 300°C to about 800°C.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a first reactant selected from the group consisting of various tris or combinations thereof, the oxygen-deficient metal oxide film has a thickness in a

range of about 5A to about 30A, wherein the method is carried out at a temperature in a range of about 200°C to about 350°C, and wherein the annealing is carried out at a temperature in a range of about 300°C to about 800°C in prior art's device in order to form the device, as taught by prior art, using conventional processing temperatures, thicknesses and materials.

### ***Response to Arguments***

Applicant argues that Stamm et al. do not teach an oxygen-deficient metal oxide dielectric film comprising  $\text{La}_2\text{O}_3$ , because Stamm et al. teach a frequency converting coating 104 being  $\text{La}_2\text{O}_3\text{S:Eu}$ , which is different and distinct from the  $\text{La}_2\text{O}_3$  recited in Claim 1 of the present application.

Claim 1 recites "forming an oxygen-deficient metal oxide dielectric film comprising  $\text{La}_2\text{O}_3$ ". Claim 1 does not recite forming an oxygen-deficient metal oxide dielectric film 33 **consisting of**  $\text{La}_2\text{O}_3$ . The phrase "comprising  $\text{La}_2\text{O}_3$ " allows additional elements to be included in the compound  $\text{La}_2\text{O}_3$ . Therefore, the compound  $\text{La}_2\text{O}_3\text{S}$  comprises  $\text{La}_2\text{O}_3$ , as claimed. Note that although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant argues that an artisan would not be motivated to utilize the frequency converting coating 104 of Stamm et al. instead of the insulating layer of Lim et al.

The new rejection states that an artisan would utilize the frequency converting coating 104 of Stamm et al. in Lim et al.'s device, not instead of an insulating layer, but as an addition to the device, when using Lim et al.'s device in an application which requires a frequency converting coating material.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

O.N.  
7/13/2009

/ORI NADAV/  
PRIMARY EXAMINER  
TECHNOLOGY CENTER 2800